

Claims

- [c1] 1.A method for identifying a region of interest for a digital x-ray system, said method comprising the steps of:
obtaining a low-dose preshot image;
overlaying said preshot image with a predefined configuration having at least one division;
selecting at least one division from said predefined configuration to identify a region of interest for at least one subsequent diagnostic image;
determining exposure characteristics for said subsequent diagnostic image based on said identified region of interest;
obtaining at least one diagnostic image using said determined exposure characteristics.
- [c2] 2.The method as claimed in claim 1 wherein said preshot image is a prior diagnostic image.
- [c3] 3.The method as claimed in claim 1 wherein said predefined configuration is a simple NXM matrix structure having simple geometric shapes for each cell of said matrix.
- [c4] 4.The method as claimed in claim 3 wherein said simple geometric shapes are squares.
- [c5] 5.The method as claimed in claim 4 wherein said squares are further divided in triangular subregions.
- [c6] 6.The method as claimed in claim 1 wherein said step of selecting at least one division further comprises the step of weighting said region of interest for exposure control management.
- [c7] 7.The method as claimed in claim 6 wherein said weighting is accomplished by way of a relative unity-normalized weighting coefficient.
- [c8] 8.The method as claimed in claim 6 wherein said weighting is accomplished by way of applying variable half-tone percentages to said region of interest.



- [c9] 9.The method as claimed in claim 1 further comprising the steps of modifying said predefined configuration according to exam specific characteristics.
- [c10] 10.The method as claimed in claim 9 further comprising the step of adjusting said predefined configuration based on a patient size.
- [c11] 11.The method as claimed in claim 1 wherein said step of overlaying a predefined configuration further comprises choosing a predefined configuration for a specific exam type.
- [c12] 12.The method as claimed in claim 11 wherein said specific exam type is anatomy specific.
- [c13] 13.The method as claimed in claim 11 wherein said specific exam type is orientation specific.
- [c14] 14.The method as claimed in claim 1 wherein said step of overlaying a predefined configuration further comprises choosing an exam specific configuration from a database of predefined image masks.
- [c15] 15.The method as claimed in claim 14 wherein said database of predefined image masks contains image masks derived from a representative population.
- [c16] 16.The method as claimed in claim 9 further comprising the step of saving a modified configuration.
- [c17] 17.The method as claimed in claim 1 wherein said step of selecting said at least one division further comprises the step of adjusting a geometry of said division to further define said region of interest.
- [c18] 18.The method as claimed in claim 17 wherein said step of adjusting a geometry further comprises adjusting a size of said division.
- [c19] 19.The method as claimed in claim 17 wherein said step of adjusting a geometry further comprises adjusting a lateral tube angle of said division.
- [c20] 20.The method as claimed in claim 17 wherein said step of adjusting a geometry further comprises adjusting a longitudinal tube angle of said division.

09683927-030402

09683927.030402
20140307 165956

- [c21] 21.The method as claimed in claim 17 wherein said step of adjusting a geometry further comprises adjusting a lateral detector angle of said division.
- [c22] 22.The method as claimed in claim 17 wherein said step of adjusting a geometry further comprises adjusting a longitudinal detector angle of said division.
- [c23] 23.The method as claimed in claim 17 wherein said step of adjusting a geometry further comprises adjusting a collimator field of view for said division.
- [c24] 24.The method as claimed in claim 17 wherein said step of adjusting a geometry further comprises adjusting a collimator rotation for said division.
- [c25] 25.The method as claimed in claim 17 wherein said step of adjusting a geometry further comprises adjusting a tube detector misalignment for said division.
- [c26] 26.The method as claimed in claim 1 further comprising the steps of:
dividing said identified region of interest into segments;
applying an algorithm to identify areas of said region of interest that contain non-value added information;
using histogram techniques to exclude areas of non-value added information during said step of determination of exposure characteristics.
- [c27] 27.The method as claimed in claim 26 further comprising the steps of:
dividing said identified region of interest into segments;
applying an algorithm to identify areas of said region of interest that contain non-value added information;
using spatial image segmentation to identify open regions indicating a particular part of the anatomy is truncated from a field of view;
providing a warning to indicate truncated anatomy exists;
making necessary adjustments to include truncated anatomy before obtaining said at least one diagnostic image.
- [c28] 28.The method as claimed in claim 6 further comprising the steps of:
communicating said selected division and weighting of said division to a

processor;
processing said diagnostic image using said region of interest information to enhance an output of said at least one diagnostic image.

[c29] 29.The method as claimed in claim 1 further comprising the steps of:
acquiring multiple images;
modifying said predetermined configuration between multiple image acquisitions.

[c30] 30.A user interface for a digital x-ray system comprising:
a display;
a user input device in communication with said display;
a database of predefined overlay configurations selectable from said database using said input device, and wherein said predefined overlay configurations may be modified on demand using said user input device and said display.

[c31] 31.The user interface as claimed in claim 30 wherein said display further comprises a color display.

[c32] 32.The user interface as claimed in claim 30 wherein said display further comprises a display having a plurality of grayscale variations.

[c33] 33.The user interface as claimed in claim 30 wherein said database of predefined configurations further comprises a plurality of configurations for a specific exam type.

[c34] 34.The user interface as claimed in claim 33 wherein said specific exam type is anatomy specific.

[c35] 35.The user interface as claimed in claim 33 wherein said specific exam type is orientation specific.

[c36] 36.The user interface as claimed in claim 30 wherein said database of plurality of configurations further comprises image masks derived from a representative population.

[c37] 37.The user interface as claimed in claim 30 further comprising memory for

storing a modified configuration in said database of predefined configurations.

[c38] 38.A method of exposure management in a digital x-ray system, said method comprising the steps of:
preparing for acquisition of at least one diagnostic image;
selecting an exam type from a database;
selecting a default region-of-interest configuration for said selected exam type;
modifying said default region-of-interest configuration as needed;
acquiring a preshot image using a low dose of radiation;
correcting said preshot image by selecting divisions in said region-of-interest configuration;
predicting a required exposure for at least one diagnostic image from said corrected preshot image; and
acquiring at least one diagnostic image.

[c39] 39.The method as claimed in claim 38 further comprising the step of selecting between an automatic mode and an interactive mode for said step of correcting said preshot image.

[c40] 40.The method as claimed 38 further comprising the steps of:
correcting said at least one diagnostic image using information from said preshot image;
displaying said at least one diagnostic image;
processing said at least one diagnostic image using image processing techniques to enhance a desired result for said at least one diagnostic image;
and
displaying said processed diagnostic image.

20140507 225836